

Motion Control Using Arduino

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Abstract

In this construction, we took a servo motor and 2 motion sensors and wired them to an Arduino Uno and connected that to a computer. Using code combined from the “sweep” example in the Arduino console and a set of code called “rangefinder” found from an online source (yet to be mentioned) it tells the servo to move a certain amount of degrees depending on which motion sensor it reacts too(if an object moves over the motion sensor, it tells the servo to move “x” degrees).

The Apparatus

The motion sensors and servo are connected to the Arduino through a series of pin cables. The Arduino is then connected to a the computer by a USB cable.

Introduction

Basics of the Arduino

The Arduino is a microcontroller board that is used to control physical outputs from input sensor data. The Arduino board is controlled through a programming language similar to C.

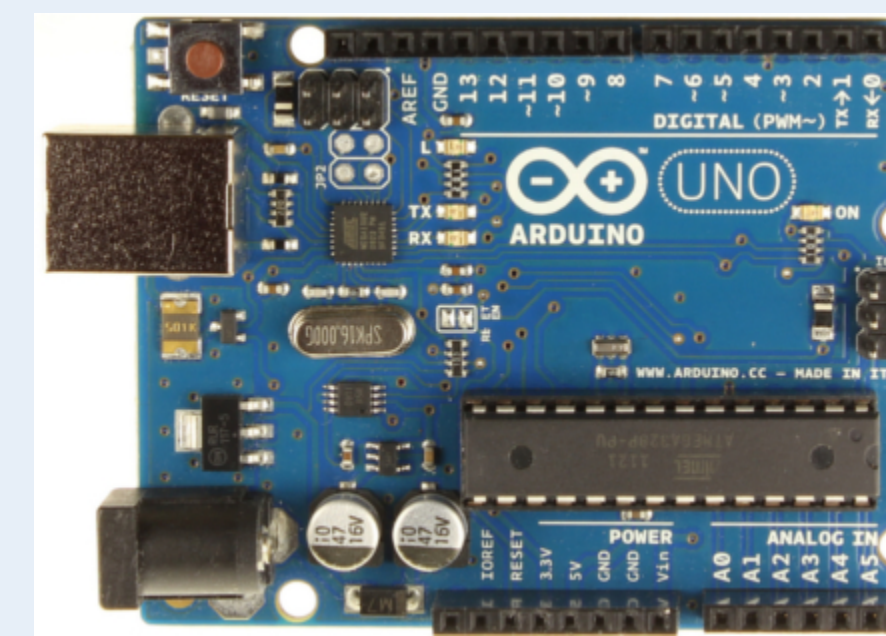


Figure 1.1 – Arduino Board

Motion Sensor

Motion sensors are devices that detect moving objects

The Infrared Proximity Sensor – Sharp GP2Y0A21YK is an infrared proximity sensor made by Sharp. It has an analog output that varies from 3.1V at 10cm to 0.4V at 80cm. The sensor has a Japanese Solderless Terminal (JST) Connector.



Figure 1.2 – Motion Sensor

Servo

A servo is a motor that has exact and precise control when turning. It is used specifically with motion sensors because of its preciseness.



Figure 1.3 – Servo

Experimental Setup

The Motion sensor inputs as far of a range it can see and then outputs it known as “Counts”, the code Levi and I wrote that converts the counts into centimeters so that the motion sensor outputs a distance in centimeters rather than counts. The Distance data is then sent to the arduino which then sends it to the servo to tell it when to move “x” amount of degrees.

Motion sensor (outputting counts) → Arduino Board (converting counts into centimeters and then outputting centimeters) → Motor Servo

Results

From what was attained in the Sensor distance Excel data sheet the results were very accurate as seen in figure 1.

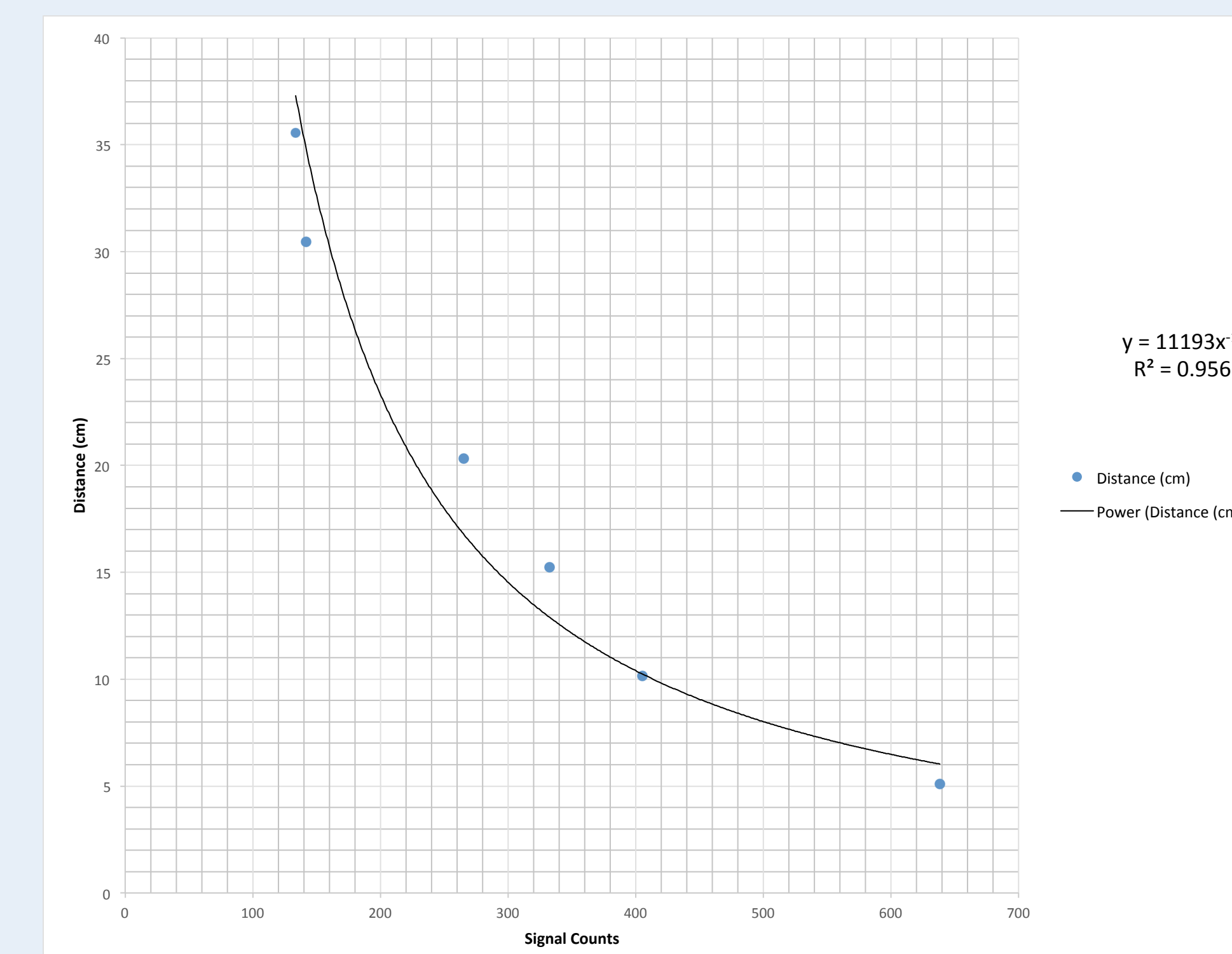


Figure 2 – Curve Graph

References

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- Grusin, Mike. "Home | Tutorials | Retail Servo Landing Page." *Retail Servo Landing Page*. N.p., 15 June 2011. Web. 11 Mar. 2013.
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Acknowledgements

- Ariel Levi Simons
- Wildwood
- SparkFun